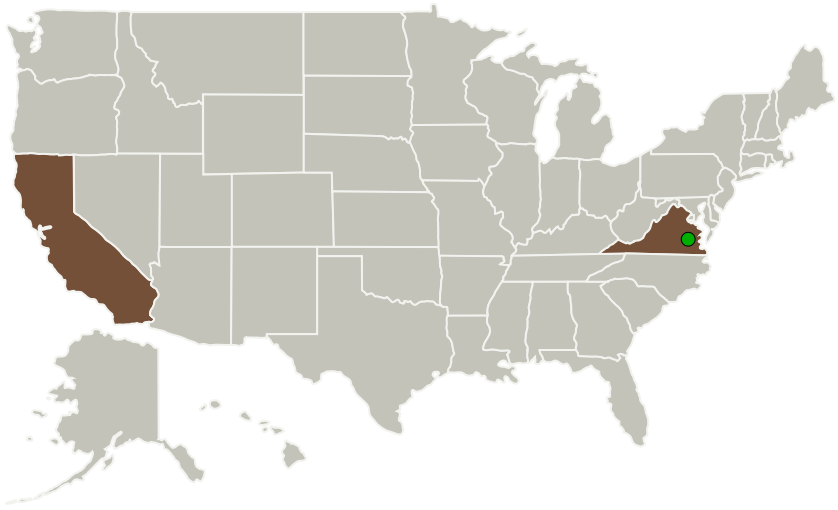
Physics-Based Conceptual Design Tools, Phase II

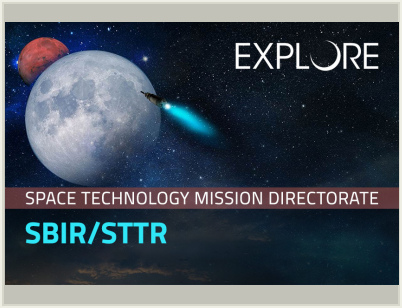
Completed Technology Project (2015 - 2017)

Project Introduction

Approaches for weight prediction, in the conceptual design phase, typically consist of parametric relations or empirical databases. Historical databases work reasonably well when applied to existing or conventional designs, however, they fail to predict accurately the weights and loads associated with unconventional designs (like the Low Boom Flight Demonstrator). There exists a need to augment existing historical databases with a physics-based methodology/capability for predicting the weights and loads of unconventional designs. In the current proposal, M4 Engineering will continue to streamline the structural layout process, improve the overall user experience, and develop a comprehensive suite of capabilities in an effort to build a complete weight statement for unconventional (and conventional) conceptual wing and fuselage designs. The main goal for this effort will be to develop a software tool capable of generating weight and load responses for unconventional designs from physics-based structural analysis simulations.

Primary U.S. Work Locations and Key Partners





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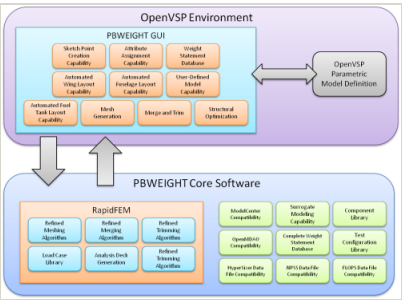
Organizations Performing Work	Role	Type	Location
M4 Engineering, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Long Beach, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Images



Briefing Chart
Physics-Based Conceptual Design Tools Briefing Chart
(https://techport.nasa.gov/image/133984)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
M4 Engineering, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

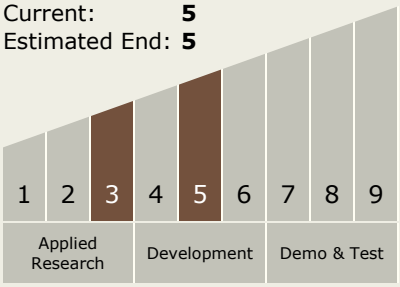
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Tyler Winter

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.2 Flight Mechanics
    - TX15.2.4 Modeling and Simulation for Flight

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System